

Welcome to



Training

Last Updated: 28 January 2014



Kensington Volunteer Fire Department Engine Delivery Training



Objective:

Upon the completion of the Pierce Pumper Delivery Program the operators will be able to identify components and safely operate the pumping apparatus and it's associated equipment.



Section 1



Vehicle and Safety Information



Specifications

- Arrow XT custom chassis, Aluminum body
- GVW – 45,500 lbs.
- Length – 30' 4"
- Height – 9' 8"
- DDC DD13, 500 hp., EPA2013
- Allison 4000, 5 speed, w. aggressive downshift program
- Hale QMAX-150, 1,500 GPM, Stainless Steel
- Husky 12 foam system
- Hercules CAFS-200, PTO
- Water – 750 gal.
- Foam cell – 25 gal. Class A
- Fuel – 75 gal.
- DEF – 4.5 gal.
- Crew positions – 6
- Governed speed – 67 mph.



Fluid Fills

Diesel – 75 Gal.



DEF – 4.5 Gal.



Vehicle Information Sticker

Pierce

Manufactured by: Pierce Manufacturing, Inc.
- Custom Designed and Manufactured Exclusively For -
BRILLION VOL FIRE DEPT

Mo./Yr of Mfg	Mar - 2005	Job No.	15273	WO No.	4549834
GVWR	20,412 KG (45,000 LB)	Tire-Limited Max Speed	75 mph	Chassis	Enforcer
GAWR		TIRES	RIMS	COLD TIRE INFLATION	
Front	8,165 KG (18,000 LB)	315/80R22.5 (L)	22.50x9.00	896 kPa (130 PSI) SINGLE	
Rear	12,247 KG (27,000 LB)	12R22.5 (H)	22.50x8.25	827 kPa (120 PSI) DUAL	

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

VIN	4P1CE01U55A004957	TYPE	Emergency Vehicle
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CUSTOM HIGH GRADE PAINT FINISH

Red	Pierce No.	90	Sikkens Autocoat LV	FLNA3042
White	Pierce No.	10	Sikkens Autocoat LV	FLNA4040

FLUID CAPACITIES

Perform All Maintenance Items outlined in the Chassis Operation Manual At The Recommended Time Intervals

Device	Fluid Capacity		Fluid Type
Engine Series 40	26.5 Liter	28.0 Quart	15W40 CI-4
Trans 3000 EVS	18.0 Liter	19.0 Quart	Dexron III
Coolant	28.4 Liter	30.0 Quart	50% Ethylene Glycol
Power Steering	3.8 Liter	4.0 Quart	Dexron III
Front Axle			80W90 GEAR LUBE
Rear Axle (#2 or Single)	17.5 Liter	18.5 Quart	80W90 GEAR LUBE
Rear Axle (#3)	0.0 Liter	0.0 Quart	NA
Cab Tilt	3.8 Liter	4.0 Quart	Dexron III
Gen Harrison - 8 KW	28.4 Liter	30.0 Quart	DEXRON II
(Refer to Owners Manual for Temperature Ranges)			
T-Case	0.0 Liter	0.0 Quart	NA
Equipment Rack - Per Reservoir	0.5 Liter	0.5 Quart	Dexron III
Comp	0.0 Liter	0.0 Quart	NA
Water Pump Transmission	12.3 Liter	13.0 Quart	Dexron III
Water Pump Primer	0.0 Liter	0.0 Quart	Not Required

Vehicle Job Number

Axle Ratings

Vin Numbers

Paint Numbers

Device

Fluid Capacities

Fluid Types



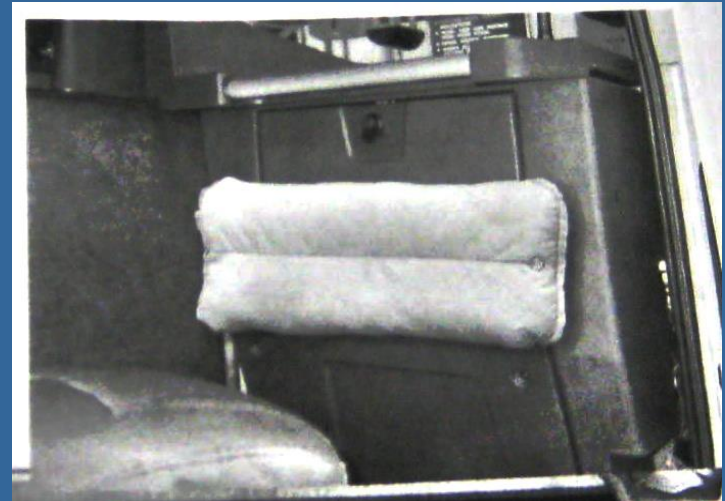
Safety Equipment

- Anti lock brakes (ABS)
- Automatic Traction control (ATC)
- Electronic Stability control (ESC)
- Auxiliary Braking systems
 - Compression brake (Jacobs)
- Pierce recommendation – “When road conditions dictate that a driver change his/her driving pattern, the driver should disable auxiliary braking systems.”
- Front Impact Protection Package
- Side Roll Protection Package



Knee Bolster Airbag – Officers side only

Do not hang and/or place anything in front of airbag





Side Roll Protection

- It is a supplemental restraint system
- Side roll will **not** operate in all crashes
- If system is activated, must be repaired by Pierce



Section 2



Cab Controls

Cab Controls

- Battery Switch
 - On position
- Ignition and Start Button.
 - Transmission in neutral.
 - Parking brake must be engaged.





Starting Procedure

1. Battery switch ON
2. Ignition switch ON, wait for ignition PROVE OUT to complete 4-5 sec.
3. Start engine
4. Shut OFF engine using Ignition switch, leave Ignition OFF
5. Shut Battery switch OFF

Cab Controls

Gauges and Warning Lamps

Tachometer

Speedometer

Display Modules

Coolant
Temperature

DEF level

Oil pressure

Transmission
Temperature

Voltage

Front Air
Pressure

Rear Air
pressure

Fuel



Cab Controls



Transmission Control

NOTE: Must have **MODE** button activated for **Aggressive Downshift** to activate

Transmission Fluid Check using shifter keypad



- Transmission must be in neutral, fluid temp 140-220 F
- Engine at idle.
- Vehicle motionless for 2 minutes

Push both arrow buttons simultaneously, release

Read codes in windows

“o L”, “oK” – Fluid level OK

“oL”, “Lo”, “02” – Fluid level low 2 quarts

“oL”, “HI”, “01” – Fluid level 1 quart high

Cab Controls



Cab Controls

Pump Shift



Cab Controls

Regeneration



Cab Controls

Switch panels - DS



Cab Controls

Switch panels - OS



Heat and A/C



Section 3



Pump Panel Controls

Pump Panel -DS



Pump Panel -OS



Pump Panel

Master Intake and Pump Discharge Gauges



Test Gauge Ports

Pressure Control

Pressure Governor

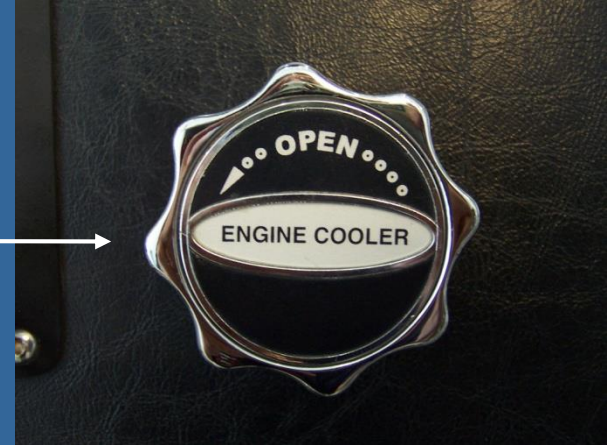


- Preset
 - Pressure: 150 psi
 - RPM: 1,000

Pump Panel

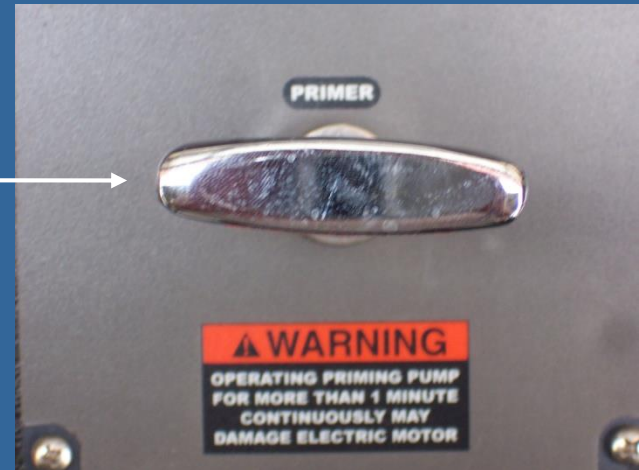


Engine cooler valve



← Tank level Gauge

Primer Valve



Foam Controls

Husky 12



Pump Panel

Foam/CAFS Discharge Valves and Gauges



Foam/CAFS capable lines

2 crosslays (1-3/4" 200')

Officers rear inboard discharge (2" 250')



System Capabilities

- 200 GPM @ 6%
- 400 GPM @ 3%
- 1,200 GPM @ 1%
- 2,400 GPM @ 0.5 % *
- 4,000 GPM @ 0.3 % * (**)

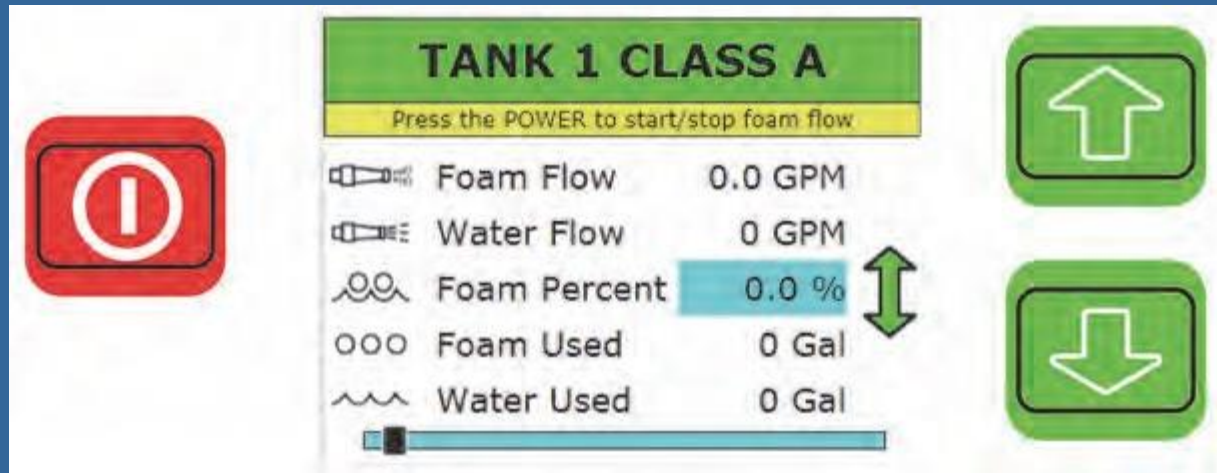
At system pressures up to 250 PSI

* Piping limitations may alter these numbers

** Normal concentration for Class A foam

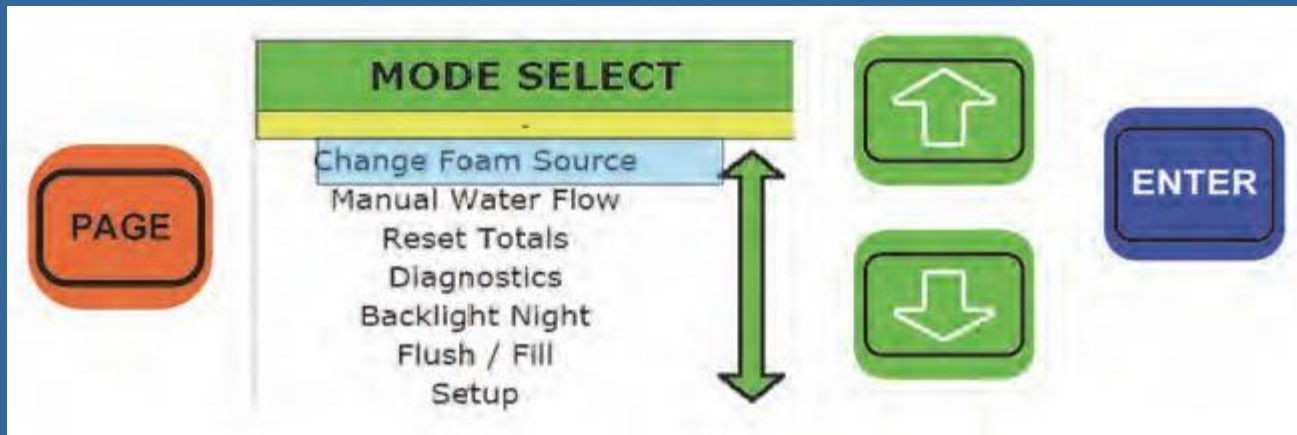


Class A Foam – Onboard Tank

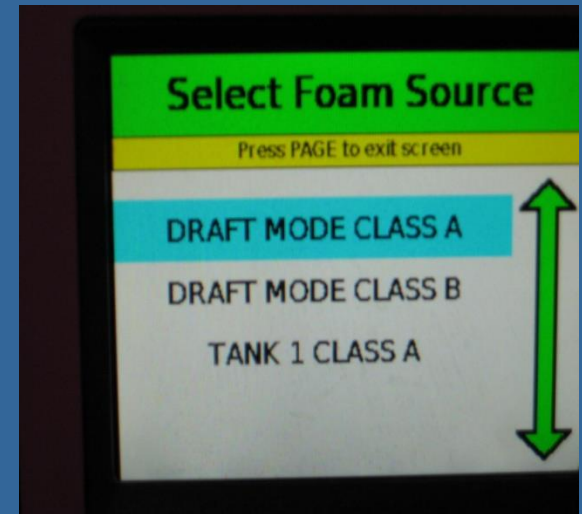
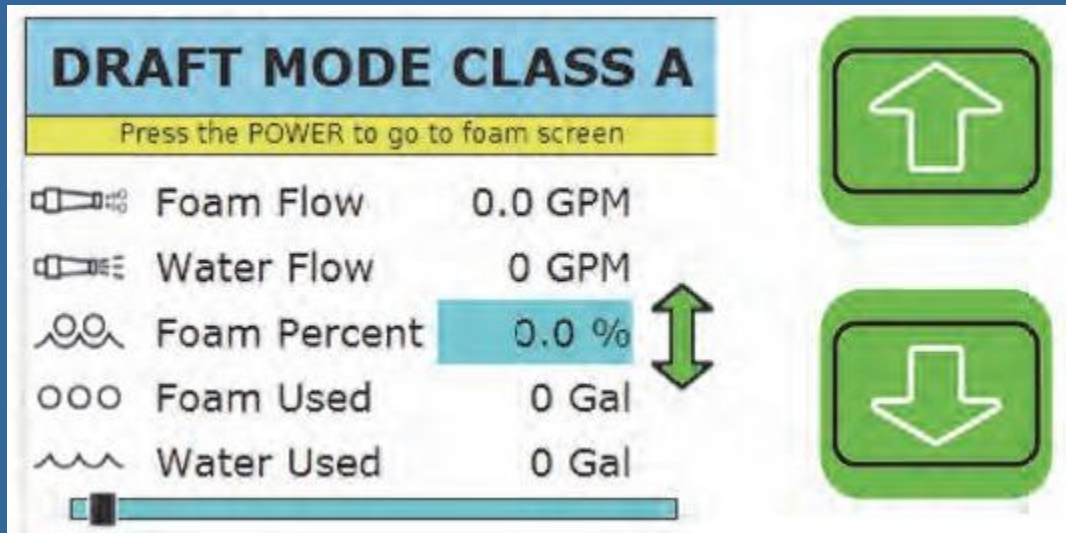


- Engage water pump (Engages foam system PTO)
- Open tank to pump valve
- Open discharge(s)
- Turn on foam system (Red Button)
- When completed, turn off foam system
- Flow discharges until mostly clear of bubbles
- Disengage water pump

Other functions

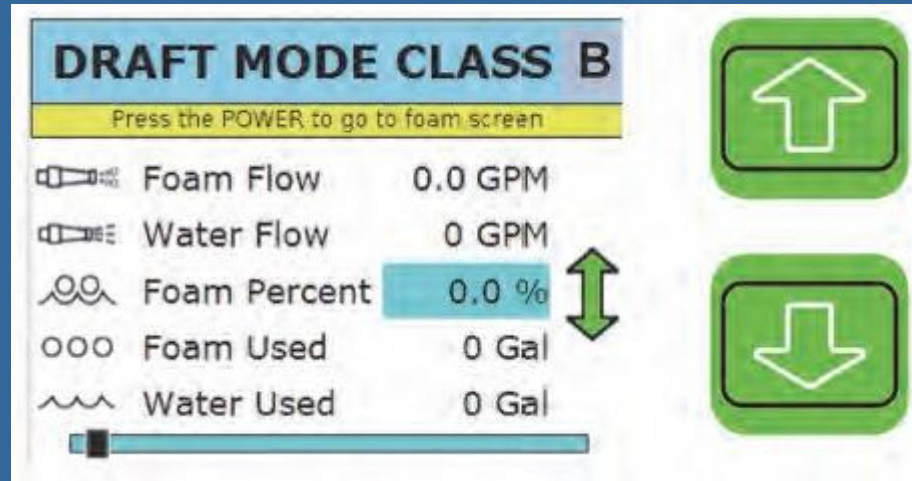


Class A Foam – External Pickup



- Connect pickup tube, foam container
- Engage water pump, open tank to pump valve
- Push “PAGE” until “Select Mode” page appears
- Up/Dn arrow to “Select Foam Source”, push “Enter”
- Up/Dn arrow to “Draft Class A”, push “Enter”
- Open discharge(s) or manifold drain
- Turn on foam pump (Red Button)
- Set Foam Percentage (if needed)
- Push and hold “Prime” (if needed)

Class B Foam – External Pickup



- Connect pickup tube, foam container
- Engage water pump, open tank to pump valve
- Select mode as per Draft Class A
- Open discharge(s) or manifold drain
- Turn on Foam pump (Red button)
- Set Foam Percentage (if needed)
- Push and hold "Prime" (if needed)
- Flush system when completed

Onboard Tank Fill



“CHECK SELECTOR VALVE”



Pickup tube



Foam Selector Valve

Hercules™ COMPRESSED AIR FOAM SYSTEM

Foam Controls



- For CAFS:
 - Compressor switch to ON
 - Switch at discharge to ON
- Manual/Auto switch should always be set to Auto.



CAFS_200.exe

Hose Loads

- (1) 100' 1-3/4" bumper line
 - 15/16" smoothbore breakaway with 75psi fog nozzle
- (2) 200' 1-3/4" Crosslays preconnect (Foam Solution/CAFS capable)
 - 15/16" smoothbore breakaway with 75psi fog nozzle
- (1) 400' 1-3/4" Drivers side preconnect
 - 15/16" smoothbore breakaway with 75psi fog nozzle
 - 100' Minuteman Shoulder Load (Nozzle Man)
 - 150' Minuteman Shoulder Load (Backup/Officer)
 - 150' Flat Load (Driver)
- (1) 350' 3" Flat Load with gated wye
 - Loops at every 100'
- (1) 800' 4" Flat Load
- (1) 1,000' 4" Flat Load connected to Humat
- (1) 250' 2" preconnect (Foam Solution/CAFS capable)
 - 15/16" smoothbore breakaway with 75psi fog nozzle
- (1) 250' 2-1/2" stack-tip smoothbore



Hose Loads – Packing Bumper Line

- 100' 1-3/4" bumper line
 - Connect 50' section to swivel
 - Pack in front of tray making two loops on initial pass.
 - Flat pack remainder.
 - Donut roll with male coupling on inside
 - Connect nozzle
 - Place in rear of tray
 - Connect female to initial 50'



Hose Loads – Packing 400'

- 150' flat load Drivers Load
 - Ear on second fold
 - Full length of bed
- 150' modified MinuteMan Middle Load
 - Place male coupling on ground and then load remainder of hose on top
 - 2/3 length of bed
 - Connect Drivers Load male to Middle Load female
 - Push hose load into bed until it stops
- 100' MinuteMan Shoulder Load
 - Do not wrap nozzle
 - Place nozzle flush with edge of hose bed with bail towards drivers side
 - Connect Middle Load male hanging over tailboard to Shoulder female



Hose Loads – 400'



Pump Inlets & Soft Sleeves

- Front Intake
 - 5" with a 4" Stortz connection with 20' 4" soft sleeve.
 - Hydrant-Stortz adapter
 - 2-1/2" to 4" Stortz gate
 - Hydrant wrench
 - Mallet
- Rear Intake – behind roll up door
 - 5" with a 4" Stortz connection with 20' 4" soft sleeve.
 - Hydrant-Stortz adapter
 - Hydrant wrench
 - Mallet
- Side Intakes
 - 6" with 4" Stortz connection
 - Officer side hose tray has 1 section of 50' of 4"
 - Drivers compartment behind pump panel has 2 sections of 25' of 4"



Section 4



Accessory Controls *Cab Lift*

Cab Tilt Operation

Caution: Before raising any Pierce cab, ensure that all items on the front bumper have adequate clearance when the cab is tilted.



Cab Tilt Controls

Arrow XT

Pump Activate Switch

Control – Raise / Lower

WARNING: Before raising cab, Remove all loose items from the cab as contents may shift

CAUTION: Check bumper extension to ensure covers are down and plumbing swivels are facing forward.

CAUTION: Ensure vehicle is on flat ground to avoid interference with components



Operating Instructions

45



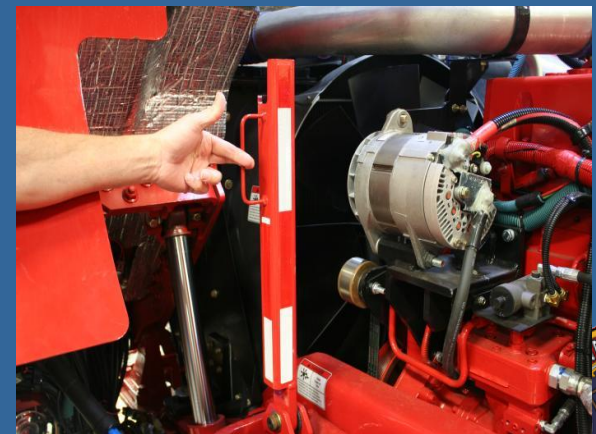
Cab Tilt Operation

Arrow XT

Raising

- Battery and ignition "ON", parking brake set
- Control in raise position
- Press activate switch
- Stay arm engaged
- Lower cab to bed stay arm

WARNING: Never work under cab unless stay arm or cab support is in place



Cab Tilt Operation

Arrow XT

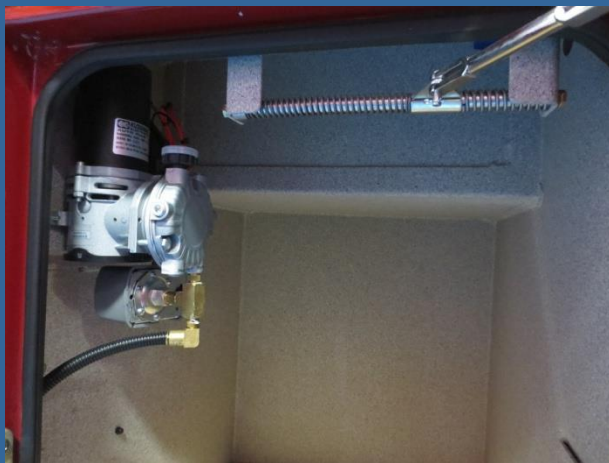
Lowering

WARNING: Before lowering cab, be sure all personnel and equipment are clear of the cab area

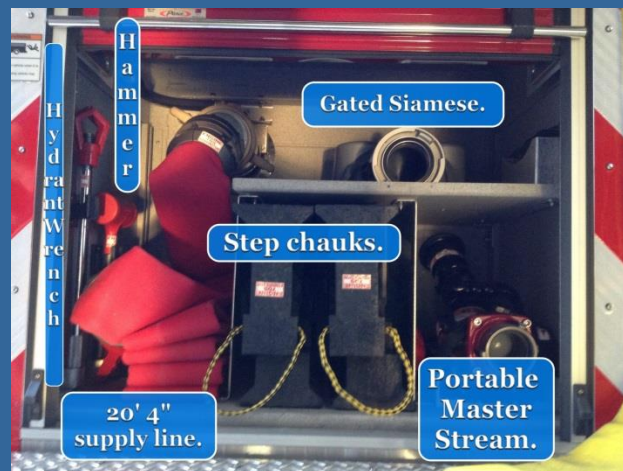
- Battery and ignition "ON", parking brake set
- Turn control to "raise" and activate pump
- Raise cab
- Secure stay arm
- Control switch to "lower"
- Push activate button
- Ensure cab is down (3 count)



Additional Features



Make-up Air Compressor
(12v)



Rear Inlet



Shoreline powered
110vac outlet in EMS
compartments

Section 5



PUMPS

Positioning and Operation

Pumping Operations

Engaging the Driveline pump

- Stop and shift to neutral
- Set brake
- Apply service brake
- Engage pump shift “down”
- Check “*pump engaged*” light
- Shift to drive
- Check speedometer
- Check “*ok to pump*” light
- Conditions for “*ok to pump*” light
- Set wheel chocks

CAUTION: Begin pumping right away and/or circulate water to keep pump from overheating

CAUTION: Running the pump dry for more than a few minutes will cause damage



Manual Pump Shift

- Transmission in NEUTRAL, parking brake applied
- Foot on brake pedal
- Move pump shift lever to middle position
- Pull manual pump shift handle out
- Move pump shift lever to lower position
- Place transmission in DRIVE



Pumping Operations

Water Supply

- **Drafting**
 - Always 20 Hg. of vacuum or less
 - Intake vacuum of more than 20 Hg. can cause cavitation
- **Hydrant**
 - Maintain intake pressure above 20 psi
 - Provides safety factor for water system
 - Intake pressure must be 20 psi below discharge pressure for governor to work properly
- **Consult department SOP/SOG"s**



Pumping Operations

Controlling with Pressure Governor

- Governor will maintain PSI/RPM's automatically
- To operate:
 - Select mode
 - Adjust by using "increase/decrease" control
- Throttle mode: operates manually
- Preset: automatically goes to preset PSI/RPM (150psi/1,000rpm)
- Low water/No water protection



WARNING: Apparatus equipped with pressure governors normally do not have pressure relief valves. The pressure governor performs the function of the relief valve, always pump in pressure governor mode.

Pumping in throttle mode can cause high pressure and/or pressure spikes. Pressure spikes can injure or kill.

Pump Operations

Disengaging the Driveline Pump

- Reduce engine speed and/or disengage pressure governor
- Shift transmission to neutral
- Speedometer must drop to 0 and then shift to "road"
- Observe indicator lights, if both off, shift is successful, if not repeat procedure.



Section 6



Maintenance and Care

Service Bulletin

If it necessary to idle engine for more than FIVE minutes, the high-idle switch should be activated to increase the engine speed to at least 1000 RPM.



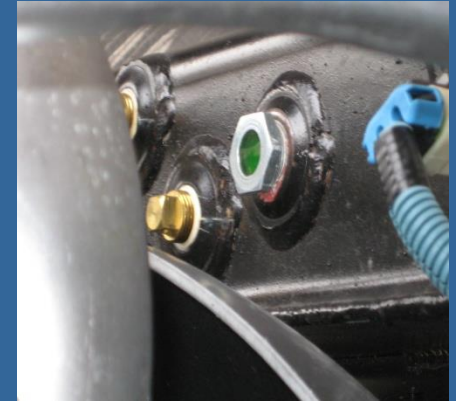
Vehicle Checks



Oil & Transmission Fluid



Coolant Expansion Tank



Radiator Sight Glass



Alternate Fluid Check Access



Power Steering Reservoir



Windshield Washer Reservoir

Vehicle Checks – con'd.



Circuit Breaker Panel



Vogel Lube



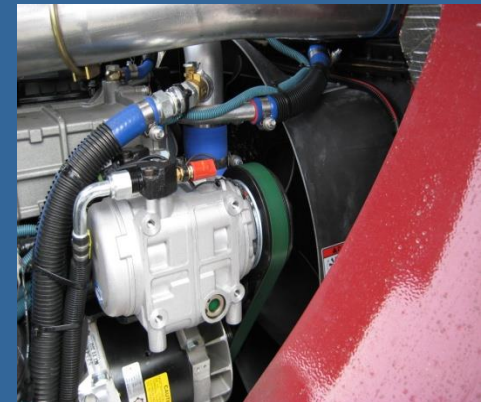
Front Axle Hubs



Cab Lift Reservoir



Air Tank Drains (4)

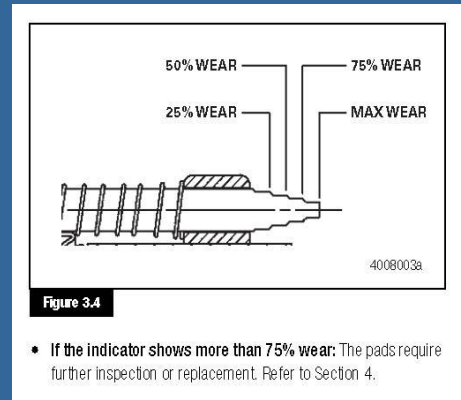


Accessory Drive Belts

Front Brake Check



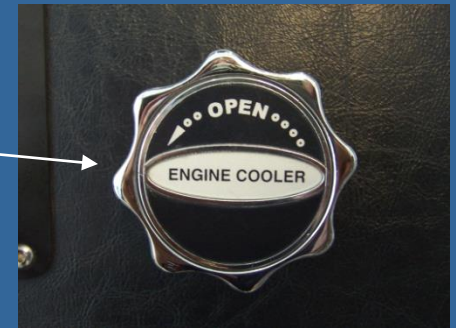
Front brake pad wear indicator



Regional Concerns

■ Heat

- Properly maintain the cooling system
- Utilize auxiliary cooler when necessary
 - Use with caution in cold temperatures
- Remove leaves from radiator in the fall



Regional Concerns

■ Cold Conditions

- Engine may not reach warm operating temperatures unless under load

Caution: As a result of not reaching operating temperature, operating a diesel engine at low idle for extended periods of time can result in engine damage.

Caution: Avoid extended idling (beyond 5 min. when possible)

Caution: Use a minimum 45 Cetane diesel fuel

Caution: Maintain a minimum of 1250 RPM idle

- **Remember:** Water freezes, and can cause major pump and accessory damage



Care of Vehicle

■ Washing

- Can be washed any time after delivery
- Use mild non-abrasive liquid soap made for vehicles
 - DO NOT USE DISH SOAP
- Avoid pressure washing

■ Waxing

- May be hand waxed 90 days after delivery

Caution: Do not wax any of the Goldstar, gold leaf, or other vinyl. Wax around it (refer to owners manual)



Tire Inflation Chart

MAINTENANCE

Table 4-9 is for Michelin® tires only. Refer to the tire data book that matches the brand of tire on your vehicle or contact a Pierce Customer Service Representative for this information.

Table 4-9: Tire Data Chart

WHEEL DIAMETER - 22.5"

11R22.5 LRH - ALL TIRES

PSI		75	80	85	90	95	100	105	110	115
lbs.	S	9385	9900	10430	10940	11510	12350	12490	12855	13220
per axle	D	16895	17820	18770	19690	20720	22700	23110	23520	23800
kg	S	4257	4491	4731	4962	5221	5602	5665	5831	6000
per axle	D	7664	8083	8514	8931	9399	10297	10483	10669	10800

12R22.5 LRH - ALL TIRES

PSI		75	80	85	90	95	100	105	110	115
lbs.	S	9980	10560	11140	11740	12310	12910	13480	14060	14780
per axle	D	17700	18700	19800	20800	22000	23200	24400	25600	27000 (1)
kg	S	4527	4790	5053	5325	5584	5856	6115	6378	6700
per axle	D	8029	8482	8981	9435	9979	10524	11068	11612	12250

(1) Except 12R22.5 XDN26440 (D)

315/80R22.5 LRL - ALL TIRES

PSI		75	80	85	90	95	100	105	110	115	120	125	130
lbs.	S	11700	12280	12870	13350	13990	14620	15260	15900	16540	16970	17500	18000
per axle	D	19190	20420	21650	23120	24220	25320	26420	27540	28640	30240	31570	33020
kg	S	5542	5763	5984	6056	6346	6632	6922	7212	7503	7698	7938	8165
per axle	D	9265	9717	10169	10487	10986	11485	11984	12492	12991	13717	14320	14980

385/65R22.5 LRJ - ALL TIRES

PSI		75	80	85	90	95	100	105	110	115	120	125
lbs.	S	12665	13280	13880	14560	15160	15780	16440	17060	17800	18300	18740
per axle	D											
kg	S	5745	6024	6296	6604	6877	7158	7457	7738	8000	8301	8500
per axle	D											

425/65R22.5 LRL - ALL TIRES

PSI		75	80	85	90	95	100	105	110	115	120	125
lbs.	S	15340	16000	16800	17680	18440	19180	20000	21000	21480	22220	22800
per axle	D											
kg	S	6958	7258	7620	8020	8364	8700	9072	9526	9743	10079	10300
per axle	D											

445/65R22.5 LRL (1) - XZL™

PSI		75	80	85	90	95	100	105	110	115	120
lbs.	S	16760	17700	18660	19610	20560	21500	22490	23590	24350	24600
per axle	D										
kg	S	7602	8029	8464	8895	9326	9752	10201	10700	11045	11200
per axle	D										

445/65R22.5 LRL (2) - XZY®

PSI		75	80	85	90	95	100	105	110	115	120	125	130
lbs.	S	16065	16930	17700	18660	19560	20480	21310	22140	22980	23890	24640	25600
per axle	D												
kg	S	7286	7679	8027	8463	8871	9288	9664	10041	10422	10834	11175	11600
per axle	D												

S = Single configuration — 2 tires per axle

D = Dual configuration — 4 tires per axle



2013 Spec Engines

Regeneration & DEF



Regeneration



Questions?